

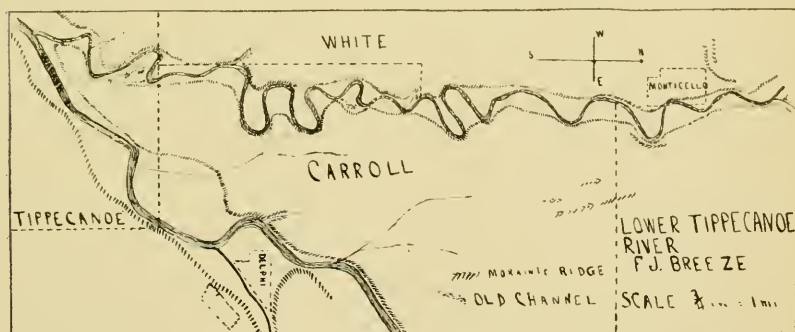
ward. Frequently on Clifty Creek a stratum of stone below the Waldron shale is seen which very much resembles the hydraulic beds of Wabash County, both in appearance and jointed structure. The laminated shale of Wabash is duplicated by some of the more argillaceous shales of Clifty Creek. The Wabash Valley and Laurel-Waldron unconformities seem to be of the same horizon and lend color to the inference that the quarry stone of Wabash County and the Waldron shale are of the same age.

THE VALLEY OF THE LOWER TIPPECANOE RIVER.

FRED J. BREEZE.

[Abstract.]

The Tippecanoe River deserves far more attention from the geographer and geologist than has ever been given to it. A careful study of this stream will shed light upon some of the problems of glacial phenomena, and will doubtless yield something of interest concerning stream and valley development. Believing this, the writer has begun a somewhat systematic study of this river. Several days of the last three months have been devoted to the necessary field work in the preparation of a map of



the lower part of the Tippecanoe Valley. This map shows the meanders of the stream and of its valley, and is presented at this time with the hope that it may be some little contribution to the geography and geology of Indiana.

By Lower Tippecanoe is meant that part of the river from the point where it leaves the region of the Glacial Lake Kankakee to its mouth.

A short distance north of Monticello are sandy ridges which doubtless marked the southern limit of the glacial lake, so that this town is near the upper end of this part of the valley, although the gorge-like character of the valley has extended up to the town of Buffalo.

At Monticello the river flows in a valley not over half a mile wide and about eighty feet deep. Farther down the valley widens and deepens so that at some points the valley is a mile wide and the bluffs about one hundred feet in height. The only exposure of bedrock, New Albany shale and Devonian limestone, in this part of the valley is found a short distance above Monticello. Nowhere in the valley were wells found that were cut down to bedrock. The slope is great, the river falling almost 100 feet from Monticello to the mouth.

At this time no explanation as to the causes of the existing features is offered, the writer preferring to present these conditions for interpretation by more competent members of the Academy. This study of the Tippecanoe River will be continued, and some results of this work may be presented at future meetings.

CONCERNING WELL-DEFINED RIPPLE MARKS IN HUDSON RIVER LIMESTONE, RICHMOND, INDIANA.

JOSEPH MOORE AND ALLEN D. HOLE.

In the Proceedings of the Indiana Academy of Science for 1894, page 53, Mr. W. P. Shannon, under the title, "Wave Marks on Cincinnati Limestone," gives an interesting description of undulations in strata in the southwest part of Franklin County, Indiana. The present paper is a record of similar phenomena in Wayne County, Indiana.

In the spring of 1901 Prof. Joseph Moore observed what appear to be well-defined ripple marks in an exposed stratum of Hudson River limestone. The exposure occurs about five miles southwest from Richmond, Indiana, in the bed of a small tributary of the Whitewater River. The stream at this point flows approximately N. 35° E., and the series of undulations, which will be called "ripple marks" in this paper, are nearly, though not exactly, parallel, and lie in a direction about N. 72° 30' E. This direction is the mean of the measured direction of several axes. The width of the stream is from ten to fifteen feet, and the ripple marks are exposed more or less plainly for a distance of two hundred feet in the bed of the stream.